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Bioactive compounds fractionated from endophyte Streptomyces SUK 08 with promising ex-vivo antimalarial activity (Article) (Open Access)

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Abstract

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Objective To determine ex vivo antimalarial activity and cytotoxicity of endophytic Streptomyces SUK 08 as well as the main core structure fractionated from its crude extract. Methods The activities of SUK 08 crude extract were evaluated by using the Plasmodium lactate dehydrogenase assay and synchronization test against rodent malaria parasite Plasmodium berghei, instead of human malarial parasite Plasmodium falciparum. The cytotoxicity of the crude extract was determined by MTT assay. The crude extract was analyzed by thin-layer chromatography and gas chromatography–mass spectrophotometry. Results The ethyl acetate crude extract showed very promising antimalarial activity with IC_{50} of 1.25 mg/mL. The synchronization tests showed that ethyl acetate extraction could inhibit all stages of the Plasmodium life cycle, but it was most effective at the Plasmodium ring stage. On the basis of a MTT assay on Chang Liver cells, ethyl acetate and ethanol demonstrated IC_{50} values of >1.0 mg/mL. The IC_{50} of parasitemia at 5% and 30% for this extract was lower than chloroquine. Thin-layer chromatography, with 1: 9 ratio of ethyl acetate: hexane, was used to isolate several distinct compounds. Based on gas chromatography–mass spectrophotometry analysis, three core structures were identified as cyclohexane, butyl propyl ester, and 2,3-heptanedione. Structurally, these compounds were similar to currently available antimalarial drugs. Conclusions The results suggest that compounds isolated from Streptomyces SUK 08 are viable antimalarial drug candidates that require further investigations. © 2017 Hainan Medical University

Reaxys Database Information

View Compounds

Author keywords

2,3-Heptanedione Antimalarial Butyl–propyl–ester Cyclohexane Endophyte Streptomyces

Indexed keywords

EMTREE drug terms: 2,3 heptane dione acetic acid ethyl ester antimalarial agent butyl propyl ester chloroquine cyclohexane lactate dehydrogenase unclassified drug

EMTREE medical terms: animal experiment animal model antimalarial activity Article controlled study cytotoxicity drug isolation drug screening IC50 lactate dehydrogenase blood level male mass fragmentography mouse MTT assay nonhuman plasmodium (life cycle stage) Plasmodium berghei Plasmodium berghei infection Plasmodium falciparum priority journal thin layer chromatography

Chemicals and CAS Registry Numbers:

acetic acid ethyl ester, 141-78-6; chloroquine, 132-73-0, 3545-67-3, 50-63-5, 54-05-7; cyclohexane, 110-82-7; lactate dehydrogenase, 9001-60-9

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